

To: Gary Jackson, Assistant Administrator for Size Standards, SBA
From: Roland Tibbetts, SBIR Program Manager, National Science Foundation, Ret.
Subject: Comment on Small Business Size Standards and Selected Related Issues
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For 21 years from 1976 to 1996 I was an SBIR Program Manager at the National Science Foundation where I designed the SBIR program. I also served on the initial SBA policy committee on SBIR in 1982. Prior to coming to NSF I had been VP of two small technology firms, one that grew from 175 to 600 employees over 11 years and the other with 350 employees. I also was a founder, director and treasurer of Allied Capital, an early and successful SBIC.

A. Size Standards.

SBA's initial policy committee on SBIR gave careful consideration to the 500 employee size standard for SBIR. Important factors considered included:

- o R&D is labor intensive and may not yield sales results for years or at all. It was the primary reason that number of employees was a size standard for SBIR
- o In 1982, the year SBIR legislation was passed, firms with less than 500 employees received only 2.8 percent of federal R&D expenditures. It is still estimated by SBA that small firms receive only 5 percent. However, small business companies employ 27 percent of the nations scientists and engineers that are in S&E positions (Source: NSF latest numbers available - 2001).
- o A major objective of SBIR was to stimulate economic growth, including the founding and growth of small high technology firms. This was also a factor in choosing the 500 employees size standard.

Size Standards The source of requests for lower employee size standards has come from many small firm presidents from the beginning. They usually wanted a limit not far above their own employment level to exclude as much competition as possible, in my judgment. In talking with many of them over the years, many were not interested in or capable (in their own words) of commercializing their SBIR results. However, they wanted to do research and SBIR was the mechanism they used for financing, including providing substantial personal income. This was never the objective of SBIR. The objective was and is to use federal R&D to stimulate technological innovation for the high risk research required to prove the technical feasibility of promising research-based innovative ideas. The goal was also that they would convert their research results into new technology, products, services and quality jobs. Actually, the vast majority of SBIR awards go to firms with less than 100 employees, and the majority, I believe to firms with less than 50. Thousands of SBIR awards have been made to firms with less than 10 employees and the program has been a major source of startups.

Economic Objectives As in the beginning, there were and are other important goals. At that time we faced severe economic manufacturing problems with the rise of Japan, Taiwan and the recovery of Germany. The US continues to be faced with economic problems particularly in manufacturing, trade deficits, and a declining dollar. In the mid 1970's Silicon Valley and Route 128 were the shining stars of investment, economic growth and quality job creation. We have a similar need today when we still lead the world in basic research, small technology firms and venture capital. In both cases SBIR was aimed at capitalizing on these resources. Specifically, there is a need for SBIR funding of promising high risk ideas from idea to proof of technical feasibility. Rather than reduce the size standards there is a need to encourage more of the larger eligible firms to compete in the SBIR program because they often are more capable of attracting follow-on private capital and commercializing SBIR results.

Complicated Standards - It is my opinion that the current size standards are neither complicated nor difficult to understand. There is good reason to have different standards for different programs with different goals. Don't get highjacked by an active relatively few and often marginal firms. Being eligible for one program should not make a firm eligible for a different program. SBA has done a good job with standards. They are known to a few million people. Changing them is a sure-fire way to make them more complicated. The only problem I see is that more and more firms fall into multi-categories but this can be solved.

Affiliates and Joint Ventures - They are both helpful to some small technology firms and useful to promising projects and firms. It is common that R&D projects are cross-disciplinary and this is increasing. Many small firms have excellent capability in one area but are weak in another that is important to the project's success. They often need to collaborate with a firm strong in an area the originator, and possibly through a joint-venture. Small technology firms also often have problems attracting capital. An investor may be interested in an SBIR project but does not want to have his investment spent on other activity in the company. The SBIR project can be set up as a separate affiliated corporation, or as a subsidiary, with the same principal investigator, so that the investor can invest solely in the new company. This can protect the government investment to date, raise capital and create a new small business. Setting up a separate company also can be used to spin off a new company, or help retain key people who want to manage their own firm where they can have a separate firm, have salary dependent more on performance without affecting others, or have separate stock options or equity based upon the new companies results. I favor allowing such affiliation to be included in the size standard definition for these reasons.

B. Venture Capital Company Affiliation

1. Role of VCC Financing I do not believe that a company with more than 51 percent of its stock owned or controlled by another firm is an independent small business. I also do not favor the proposed VCC approach because I believe it would soon lead to other agencies doing the same thing. SBA and small firms would no longer be the focus of SBIR. I do not believe that SBA should make an exception for any particular field such as bio. Once that exception is made there will be no legitimate argument to prevent similar policy in other areas. Certainly national security needs exceed the medical research field in current importance. A similar case can be made for many Defense Department needs, manufacturing, energy and transportation needs. If an agency feels that research proposed is that important it can fund those proposals with non-SBIR funds. I believe that an exception for the bio area would significantly damage the SBIR program within agencies, the small business community, and its economic results by significantly reducing the number of ideas proposed and awards made.

The need for the VCC approach is questionable. Hundreds, if not a few thousand, SBIR firms have obtained follow-on venture and other private capital while retaining at least 51 percent ownership. They have stayed under to 51 percent in some cases by growing, selling or issuing more stock to employees and others to increase their own percentage of ownership, and with this they have obtained more VC money. A few have even sold their initial SBIR firm to another firm and started a new firm with the proceeds. Dr. Greg Olsen (EPITAXX and Sensors Unlimited, Princeton, NJ) is now on his third firm with two multi-million dollar successes behind him.

2. Impact: The case being made by the bio-related VC's is far too costly and high risk for SBIR. It is also unfair to other agencies and SBIR firms. It will establish a precedent that other agencies might want to do if only to reduce the workload by making far larger and therefore fewer awards. They have stated that the cost of bringing a new drug or instrument to market now ranges from \$300 - \$900 million. This is completely out of the range of SBIR projects ultimately making a significant contribution to new drugs. We are talking about SBIR funding maybe one percent of the task although I assume the firm will then ask for more awards on the same project. Just how far can a \$100,000 Phase I and a \$750,000 Phase II go to meet that need?

Their goal will be that if the first project were promising, then there would be many more proposals on the same drug or devices to take it further and for larger awards still. Far more would be invested in a single project and a single company than is the case today with enormous risk and time required before SBIR results might make a difference. Their current plan is to make far larger SBIR awards like \$1 million Phase I's and \$3-\$5 million Phase II's. Why not do the same for some Home Security, DOD? I think both would quickly want to have the same option.

Each \$1 million Phase I, for example, would eliminate nine other Phase I awards that also were recommended at the current \$100K level. A \$3-\$5 million Phase II would eliminate 3-6 other recommended Phase II's. And these might well be the first of a series of awards to the same firm on the same drug effort, as mentioned above. The number of awards at any agency doing this would sharply decline and the number of firms participating in SBIR more so. Congress wanted to see more small

business participation in federal R&D. This means making more awards, evaluating more innovative ideas and possible breakthroughs in many areas, not less. If an agency feels that the large proposals are so promising, they can always fund them with non-SBIR money. But as we know, they will not do so. The VCC idea is to use SBIR money on a substantially larger scale to fund the highest risk research that they do not want to fund. It will change the SBIR program, significantly reduce the number of awards and participating small companies.

When twice Nobel Prize winner Linus Pauling was asked how do you achieve a breakthrough, he replied " Have lots of ideas and throw away the bad ones." SBIR was designed to increase innovation and breakthroughs by seeking a lot of ideas, fund the best one out of 8-10 to see if they looked technically feasible and commercially promising via Phase I. It was then to fund the most promising half and stop spending money on those that don't look promising as soon as possible to save as much as possible for the most promising in Phase II. The goal was not to fund a few major projects with a few small companies. It was to increase the opportunity for more of our tens of thousands of small high tech firms to participate in federal R&D. It is doing both of these quite well. I believe that the best policy is for the bio industry and venture capital group to conform to the same rules as others because otherwise we will soon have a very different and far less effective SBIR program.

Economists have stated that economic progress is determined by the pace of innovation. Medicine is only one important part of the economy and drugs and devices are only a smaller part of it. Innovation is a very high priority at this time to the US in many areas and the highest priority is not the bio or medical area. It might be security, Iraqi war needs. It also might be our industrial competitiveness versus China, manufacturing, nano-technology, new materials, robots, electronics, communications, energy conservation, environmental concerns, transportation needs, agriculture, etc. And we have a trade deficit that is unsustainable.

We lead the world in small tech firms, basic research and venture capital. We need to exploit this advantage. Our small high tech firms and innovation may be the best policy we could have to stimulate innovation, and private investment in new technology, products and services. This is what SBIR is all about, not focusing on one area or large awards to fewer firms where SBIR funding will be a fraction of the total need. We also need new breakthroughs in many areas and our small high tech firms are as good a bet as any to do this as they did in Silicon Valley and Route 128 years ago. I believe that the VCC approach would have a negative impact on SBIR and would be criticized by every state, thousands of small businesses, by the rest of the VC industry and jeopardize the program.

This is not to say that SBIR doesn't need some change. It is time to consider larger awards, but modestly higher that does not reduce the number of proposals, ideas, and awards too much. I suggest increasing Phase I's to \$150,000 and Phase II's to \$1 million. This will cut the number of Phase I's by one-third and the number of Phase II' s by one-quarter, significant but viable. SBIR will still make a lot of Phase I's and see a lot of proposals and ideas. In some agencies we are now getting 10 of these proposals for each one they can fund. This would allow SBIR agencies to invest \$1,150,000 in a single project. It is my belief after 40 years in this field that if a small technology firm cannot attract private support after the government has spent \$1,150,000 on the idea, then it is better to fund another recommended proposal. SBIR should not be funding \$1 million Phase I's and \$3-5 million Phase II's.

There is great need for the first money to pursue the highest risk proof of technical feasibility. Few venture capital firms or other private investors will fund at the idea level. They want to see technical feasibility first. This is what SBIR focused on from the beginning and it is still the right objective. I am very concerned when SBIR and VC firms want the government to fund larger amounts with no early private investment. It is no wonder that the bio firms are having trouble with new drugs when their first money faces a \$300-900 million requirement downstream. Obviously few are going to do it and they want to use SBIR funding for this purpose, and as much as they can from SBIR. It would be a dangerous approach. I suggest that bio have the same limitations and requirements as other SBIR awards.

3. Types of Firms and Projects That Benefit Obviously the bio firms would be the beneficiaries and all other areas not only would benefit the least, but also would actually receive far less and/or fewer awards.

4. VCC and Not-for Profit Organizations Affiliations. This would exclude VCC affiliation as well as not-for-profit organizations. Not-for -profits receives about twice as much federal R&D funding as small business. In 2000 (latest figures) they received \$5 billion of which \$1 billion was for non-profit FFRDC's. Small Business received an estimated \$3 billion, about one-half of it for SBIR.

5. VCC Exclusion Impact I do not think excluding VCC's from affiliation would adversely affect the ability of small firms to access private capital as explained above. If SBIR results are commercially promising, VCC's will be interested.

6. Create Repeat Winners? Yes, I believe the bio approach is not only to seek much larger awards but also to seek multiple awards on the same project. This could significantly decrease the number of firms involved in NIH SBIR and other bio awards.

7. Alternative Approaches NSF's Phase IIB approach has a great deal of merit. It requires the Phase II applicant to go after follow-on funding early. The private funds must be provided in advance of NSF Phase II support and they must be spent on the SBIR project, not simply provided to the company.

After Phase I, NSF can make an initial Phase II award of less than the \$750,000 limit. For example, it might be \$400,000 that with Phase I would be a total of \$500,000 of SBIR support. The SBIR firm could also obtain the additional \$350,000 by obtaining twice that amount or \$700,000 from private sources. This would mean that the firm had a total of \$1,550,000 funding for the project at current SBIR levels. NSF has said that about one-half of Phase II's have chosen the Phase IIB approach and obtained such support. SBIR has provided the firm \$850,000 and the private firm or VC \$700,000. Similarly, NSF might fund the Phase II at \$500,000 leaving \$250,000 for Phase IIB. If the private firm or VC funds twice that or \$500,000, the total project would have \$1,350,000.

The incentive of this approach for a VCC or other private investor is that the SBIR money is taking the initial up-front, highest risk to prove technical feasibility and will contribute more than half the total R&D cost of a promising idea that has chosen through a very competitive process. This approach forces an early focus on commercialization, partnering and a substantial private sector investment. These are the ingredients that convert research on innovative ideas into new technology and commercial success. I believe it is a change of major importance to the performance of the SBIR program.